A Sentence from B. F. Skinner

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(1902-1989)

Abstract: *A sentence by Professor B.F. Skinner, "It occurred to me to go for a walk," provides an opportunity to give it a framework of quantized subjectivity, as distinct from Skinner's approach of contingent reinforcement. Skinner's analysis of "cognitive thought" is sustained, but this in turn has to be rejected by post-Einsteinian theory with respect to subjectivity, ignored in cognitive psychology and Skinnerian Behaviorism alike. Modern science begins with the complexity of events, as in theories of chaos and turbulence, and it is from this standpoint that the growing science of subjectivity made its beginnings in Q-methodology, as concourse theory. Self-reference is crucial in this development, and is advanced in terms of the everyday communicability of a culture, largely as verbal behavior. Skinner's well-known achievements in this matter remain in the determinative framework of Newtonian science. It is time for recognition of the indeterminateness of nature, and for acceptance of a science for subjectivity.*

Introduction

The article in *American Psychologist* for January 1989 by Professor Skinner, entitled "The origins of cognitive thought," provides an opportunity to lay before psychologists in America (and indeed the world) what has become the gist of Skinner's work for the past many decades, in light of a sentence from the article, namely "It occurred to me to go for a walk." Skinner attends to this, and many other statements of the same kind, by resorting to the etymology of words that refer to feelings, as he had done earlier in *The Times Literary Supplement,* "Outlining a science of feeling" (1987, p. 490).

The statement, Skinner cryptically remarked, "if it meant anything," is that the person *takes a walk.* His theory, of course, is that "verbal contingencies of reinforcement" explain the effect – the walk. The words are like corn that the human pigeon pecks as rewards for a walk.

I am to look, instead, at the subject of the statement, the "I" who takes the walk. My thesis is that we can ask the person why it occurred to him/her to take a walk. And not merely to learn whether it was because of a need for fresh air, or to be rid of boring company, but more profoundly, to examine the subject as such, with as much thorough theoretical foundation as Skinner

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devoted to the object. Moreover, whereas we shall apply post-Einsteinian theory to the subject, everywhere ignored by Skinner, we have to ask whether his thesis for the object, which is intrinsically Newtonian, can now be sustained.

Background

V. Edwin Bixenstein, in *Science* of 1964 (Vol. 145, 31 July) took Skinner to task for a certain complacency about his attitude toward psychology, but also about the paradox that on the one hand Skinner advocated a nose-to-the-ground attitude, of looking for facts in *rerum natura* and discounting theory, while on the other hand he was using theory masterfully. Bixenstein felt that Skinner's influence was and would be likely to remain Newtonian in mode of thought, oblivious of the Einsteinian revolution then under way, and now enveloping science – at least physics and the natural sciences. He felt that Skinner's own paradoxical stance explained the fascination of Skinner's ideas, because of the tension aroused among his fellow psychologists.

The paradox remains, confounded now by a double entendre, for Skinner is of course critical of "cognitive psychology," which has turned to brain science and computer science for confirmation of its theories: He writes:

> Brain science, they say, will eventually tell us what cognitive processes really are. They will answer, once and for all, the old questions about monism, dualism and interactionism. By building machines that do what people do, computer science will demonstrate how the mind works (Skinner, 1989, p. 18).

Not so, responds Skinner. No account of what is happening inside the human body, "no matter how complete," will explain the origins of human behavior. We have to ask, he insists, why people do what they do. And this we can trace to *contingencies of reinforcement*, "especially the very complex social contingencies we call cultures."

Skinner admits that this is treating the person as a black box, ignoring its contents: Hopefully, however, by a cooperative effort of etymology, brain science, and behavior analysis, an explanation will fill the box with science. He admits that there are at present two "unavoidable gaps" in this: One is the response of the organism to the stimulating action of the environment; the other is between "consequences and the resulting change in behavior."

All of this we find in pages 13-14 of Skinner's article. Meanwhile, the analysis of behavior can go ahead, of course, in Skinnerian fashion; and when brain scientists discover new variables affecting behavior, they will have to turn to behavioral analysis "for the clearest account of these variables." (Thus, if I may interject an example, the "butterfly effect" of chaos theory calls for some account in Skinner's contingency reinforcement theory.)

The "contingencies of reinforcement" to which Skinner is making reference are *verbal;* we report what we feel or introspectively observe, and our sentences reward us for the actions we take. But, Skinner adds, the *words*

cannot be used to make science: to say that I went for a walk because I wanted a breath of fresh air is, of course, not a scientific explanation, whereas "verbal contingencies of reinforcement explain why we report what we feel or introspectively observe."

Skinner concludes:

> . . . these words cannot be used in their science! . . . Science requires a language. We seem to be giving up our effort to explain our behavior by reporting what we feel or introspectively observe in our bodies, but we have only begun to construct a science needed to analyze the complex interactions between the environment and the body and the behavior to which it gives rise (Skinner, 1989, p. 18).

Consciousness and Conscience

We are in agreement with Skinner as to the intentions, to make science. We agree that cognitive psychology isn't on the right track. But there is a possibility other than Skinner's for the study of behavior, and it uses words to make a science, based upon what we feel in our bodies.

Is it not strange, the question arises, that Skinner has not given *consciousness*, and *conscience*, the etymological analysis he has so brilliantly afforded commonplace words like *doing*, *sensing*, *changing*, and *staying changed*, *wanting*, *waiting*, *thinking*, and *mind*? The words "consciousness" and "conscious" are preeminent in the subjective domain, and at the core of a subjective alternative to Skinner's thesis.

The word consciousness came into the English language with Descartes, in the 17th century. Conscience evolved nearly three centuries earlier, in the 14th century. Few of us realize that these are relatively new words in our language.

This we learn by referring to the source used by Skinner, the *Oxford Universal Dictionary* (Onions, 1933), but we can read about it in C. S. Lewis's *Studies in Words* (1967, pp. 181-213) where a section is devoted to conscience and consciousness.

The first use of consciousness was by Descartes with the modern meaning of *conscious of*. Before that, down the centuries from Greek and Roman days, there was the quite different connotation, *conscio* in Latin and *sunoida* in Greek, meaning "sharing knowledge."

In Latin, *scio* is "to know," *con* is "with." So there is the Latin noun *conscientia*, and the adjective *conscious*, meaning . . .

I know together with (someone) . . . or,

I share (with someone) the knowledge that . . .

Words, as we all know, change in usage. From *conscientia* there came the word *conscience* in Middle English (c. 1350); and then, much later, the word *consciousness* (c. 1650, with Descartes).

Lewis found it helpful, for good reason, to restore the word *conscire* to use, to mean "sharing knowledge." According to Lewis, the meaning of

conscious in the modern sense is difficult to find in the classics. It is hinted at by Tertullian, in *De Testimonio Animae V* (c. 150-230), who speaks of convictions lodged in our "innate conscientia," with something therefore of the sense of "mind," or "awareness," or "understanding." But this was rare, and for more than a thousand years, conscientia developed only in relation to sharing knowledge with someone, coming down the centuries untouched by the meaning given to conscientia in modern times.

You can find the above statement described in more detail in "Conscience and consciousness" (Stephenson, 1980).

C. S. Lewis proposed that the common things and events of daily life pass us by without mention, i.e., without entering into consciring. The root *conscio*, therefore, never took shape with respect to everyday things, whereas it sprouted abundantly for human affairs of a conspiratorial nature, the word *conscience* following suit, since guilt and secrecy go hand in hand. It is scarcely necessary to add that modern science is secretive, and without much conscience.

Cogito, Ergo Sum

When Descartes said *cogito, ergo sum* it was of profound *theoretical* significance and not merely an etymological change. He was trying to be scientific. Unfortunately it was translated as "I think, therefore I exist." It was not "I" who thinks, but *me who is sharing knowledge.* Putting consciousness into "I" was a blunder that set psychology into three centuries of wild-goose chasing after an etymological mistake.

What happened to *me* presents the problem. Consciring has the meaning of sharing knowledge between two or more persons, or with oneself self-reflectively. However, it is a frailty of mankind, apparently, to want to share only *unusual*, *secret*, or *surprising* things. So today a housewife is implored to share her secret recipe; and the daily news is made up of factualities on murders, accidents, catastrophes, and every sensation or oddity, but not (as is often remarked) the everyday ordinary things of life. Thus, in classical languages the root *conscious* was quickly attached to secret knowledge (of conspiracies and the like), and the words *conspiring* and—by guilt—*conscience* were early in common use. The secrets were usually of the conspiratorial kind; but lovers also shared secrets, and even Sophocles could accept "goodness" ("be valiant, he is conscience to himself") while Shakespeare remarks that "conscience makes a man a coward": conscious to, in Sophocles, not conscious of, i.e. *conscious with himself, not conscious of himself.*

Thus it was that *conscience* arrived three centuries before *consciousness.* Note, however, that the words are not explaining behavior, but have direct reference to the sharing of knowledge. If one had to find a word to capture the true meaning, it would be *communicability*, i.e. we *communicate* with

others and within ourselves. It remains language (or comparable symbolic use). But it is also intrinsically self-referent: It is me who communicates.

The change from "consciousness" to "communicability" is described in "Consciousness out – subjectivity in" (Stephenson, 1969), in "Foundations of communication theory" (Stephenson, 1969a), and in "Concourse theory of communication" (Stephenson, 1978).

What, then, is this *me*?

Skinner cannot say. His argument goes as follows: "I am reading a book," how can we describe what we feel or introspectively observe at the time. There is very little to observe. The behavior seems spontaneous: It just happens. We say it "occurs," as in "It occurs to me to go for a walk." We replace "It" with "thought" or "idea": what happens is the *walk* anyhow. Skinner so disposes of all mentalisms," of *intention, attitude, purpose,* and of course *consciousness,* and concludes "as experimental analysis has shown, behavior is shaped and maintained by consequences that lie in the past" (p 14). It is unfortunate, he adds, that what has happened in the past "leaves few observable traces." Behavior itself, therefore, has to be given an initiating, originating, creative function (p. 14).

The Behavioral Plexus

This is difficult to accept. We are all fully aware of the difficulties facing the psychologist who wishes to understand any neurological anomaly. Oliver Zangwill, in *Psychology as the Study of Behavior* (1955) gives the example of parietal lobe injury, where the patient, with no defect in perceiving depth and distance, is unable to assess the finer spatial properties of the visual world. He or she cannot fold a sheet of paper neatly in four, draw a map, or even tie up his/her shoelace with appropriate dexterity (Zangwill, p. 15). He concludes that it has been impossible to specify the defect in the traditional categories of "sensation, perception, action and thought." It involves them, but is not reducible to them. In general, he concludes

> The conceptual furniture of traditional psychology is of little or no value in the elucidation of cerebral syndromes and quite new categories of function will be needed if psychology is to take adequate account of them (Zangwill, p. 16).

He regarded *rapproachment* between psychology and physiology as the most important outcome of the Behaviorist movement.

Professor Skinner represents such an objective, and his contingent reinforcement thesis is its epitomy. Professor F. C. Bartlett, at Cambridge in England, had the same purpose, but kept his efforts close to human behavior; he looked for situations in which the subjective determinants of responses were apparent; and he disavowed simplified models of reaction – e.g. the operant nature of a pigeon's pecking in Skinner's box. The *human observer* would always be essential. But neither Bartlett nor Zangwill and their followers distinguished between psychologists as the observers, and

subjects themselves as self-observing, except as introspection. All failed to recognize that introspection is not the last resort into subjectivity because all, except Skinner, accepted "consciousness" as substantive. Having removed this *non-ens*, the problem remains, as to the relation between an influence from "within" the individual, as intrinsically involved in behavior "outside." I confess that my own view on this matter is to wait until neurophysiology is further developed – even in the last five years there have been advances in "brain science" of great importance, such as the "butterfly effect" of Edward Lorenz. From this source psychology may develop the behavior so induced. It was precisely because quantum theory and factor theory were congruent that we were able to go ahead with Q-methodology to see how far it could take us in psychology – and it led at once to states-of-feeling, not to individual difference in cognitive capabilities. So it will be in due course for the new physics of turbulence and chaos; indeed already, I have observed something very like the "butterfly effect" in Q.

Thus, my view is simple: I couldn't go far wrong by following the lead of Niels Bohr in physics, more especially because my early training was in what is now nuclear physics. This led to the one categorization of Q, that of states-of-feeling, analogous with states-of-energy in physics.

Feeling

That we feel in acts of *doing*, *sensing*, *wanting*, *waiting*, *thinking*, *mind*, according to Skinner, is an age-old fallacy. These are all things people *do*, and no account of feelings, "no matter how complete," will explain the origins of human behavior, especially with respect to "the very complex social contingencies we call cultures." Which is vintage Skinner.

But suppose for a moment that there is *me*. I have just been at a meeting of cognitive psychologists, and find myself very critical of their premises, just as Skinner is (and we are both correct). I finally can stand it no longer, and leave the meeting, saying "It occurred to me to take a walk." Skinner supposes that, yes, I could take a walk because I wanted a breath of fresh air, or because I have taken a walk before. But I was angry, and in the course of a few minutes in the open air, I uttered a hundred statements –

> I couldn't stand another minute in their company; they talk nonsense; talk of ignorance about psychological history; it passes my comprehension; what shortcomings; they are always complaining and being sorry for others; they are so convinced that it's useless to try to talk to them; I suppose I should be more patient; but it was insulting; it goes back 30 years; I resent being ignored; I'm really modestly convinced of my own imperfection and don't need their advice; why am I so upset? the issue is between old-fashioned Newtonianism and post-Einsteinianism; I don't care what they think . . .

and so on for a hundred more, *every one self-referent*, and all in relation to the simple statement, "It occurred to me to go for a walk"!

Skinner will reply, of course, that these statements still merely reflect contingencies of reinforcement. Suppose we grant this. It remains true that the statements are self-referent – it is *me* uttering them. We have learned already that the statements are truly *behavioral*, mere statements of communicability, of "shared knowledge." I can collect a large number about the event, every one of them spoken by *me*. We call this a concourse, and we are tempted to call what follows, the *Concourse Theory of Behavior.*

The Concourse Theory of Behavior

Everyone with knowledge of Q-methodology knows what to do. The event of my walking out of the meeting is represented as a *psychological event*, as defined by J. R. Kantor's interbehavioral formulation, namely:

PE = C(k, sf, rf, hi, st, md) (Kantor, 1956, p. 17)

where PE is a psychological event (*me* and the outcome of the meeting above introduced); k symbolizes that the event is unique, C that everything is interactional, and the symbols sf, rf, hi, st, md refer to different aspects of the event, from a common-sense standpoint. For *me* and the meeting, sf could have been the stimulus, it seems, that made me angry (all were praising the advances made by the cognitive psychologists); rf would be my going out for a walk; hi included my knowledge of psychology, in many aspects that agree with Skinner's rejections of cognitive psychology, but went further, into quantum theory; st, the immediate setting, was, perhaps, the article by Skinner on the "Origins of cognitive thought"; and md, the medium of the event, the present climate of *objectivism* as represented in physics and Behaviorism.

The PE merely represents *me* being retrospective about the event, in a sort of unwitting introspection, except that (being naïve) I merely *describe* what I *feel* about the matter of the PE. This I do by way of Q-technique. The problem was to *measure* my feelings, which Q-sorting achieves on the basis of a purely theoretical "forced choice" scale, from *pleasure* to *unpleasure*, such that every Q-sort gives an average score of zero (m = 0) for feeling! *This for every Q-sort, for every person, in any culture, for any condition of description!*

It sounds "crazy," and was never seriously considered by anyone other than myself. Statistics, so to speak, was in my blood, and this dramatic step was taken as if for granted. Max Born, who performed the same service in nuclear physics by ridding it of traditional forms of measurement, had to admit to the same nonchalance, so familiar to him was his statistical way of thinking (Pais, 1986, tells the story). In psychology, it is, and was, a dramatic proposal – *to dispense with all normative procedures for measurement of so-called mental activity, such as intelligence, attitude, personality, capabilities, etc. and to replace them by one scale, the same for everyone, that gives zero to everyone for every Q-sort they perform.*

Quantum theory, however, was already at issue. When the individual performs several Q-sorts for the same PE for different descriptions of it, it is

now that person's "inner" feeling that varies with the different descriptions. The situation is now completely out of any experimenter's control – what "goes on" in the "inner" feeling is the person's unique province, of naïve self-reference, inaccessible to anyone else. The "statements" of the concourse, however, are free to vary in Q-technique scores for different Q-sorts, while maintaining the zero average for each of them. In short, the "statements" of a Q-sample become the "ghost-field" for the "inner" feelings of the Q-sorter. It is to this that quantum theory, in the form of Q-factor analysis, applies. When a series of different Q-sorts are performed about a PE, their factor analysis results in a table of operant factor structure, as in Table 1.

Table 1: Operant factor structures for my feelings about a meeting with cognitive psychologists

Descriptions		Factors		
		I	II	III
C1	What angered me	--	X	--
C2	My feelings about contingent reinforcement	X	--	--
C3	My feelings about concourse theory	--	--	X
C4	Feelings about the walk-out	X	--	--
C5	My feelings about cognitive psychology	--	X	--
C6	My feelings about Newtonian methodology	X	--	--
C7	Feelings about changes in my behavior	--	X	--
C8	Feelings about me as such	--	--	X

(X = significant factor loading, all other variables insignificant)

This is all for *me*, who performed the eight Q-sorts C1 to C8 to represent the feelings I had about the PE. Note that each Q-sort is a description of one or other aspect of the situation, that is, of the one reality. Note also that the "statements" were collected with that same reality in mind.

Now, however, a transformation has occurred: the factors A, B, C are *sui generis*, altogether different from what was assumed about reality in the J. R. Kantor formulation – nothing of any of the functions enters the factors in any linear determinant sense; the factors are not tested solutions for the Kantor functions, but factors which obviously originate in the Q-sorter's "mind" so-called, but actually formed by the quantization of the "ghost-field" of the Q-sorter's "inner" feelings.

The factors are theoretical Q-sorts, each of immanent self-reference. Neither the Q-sorter, nor the experimenter, can possibly be aware of what these will be – not even me, *in the above example. They are not to be Combining*

considered as "out of the unconscious," or "subconscious," though they may show dynamic processes: they are self-references that the Q-sorter recognizes when shown them – usually as a matter of surprise.

The factors are quantized. A, B, C, are not only orthogonal, but are in complementarity relationships, AB, AC, BC, being subject to Niels Bohr's Principle of Complementarity (Stephenson, 1986b), and to *intentionality*, to the effect that the factors are not *predictive*, but only indicative of *possibilities* (Stephenson, 1987a).

The Achievement

Feeling, rejected by Skinner, is the fundamental concern of the subjective science now facing psychology.

I give the word "feeling" a common-sense rendition, but assume it to be a very complex matter. Is my angry exit from a meeting any less complex that the everyday melting of ice? Modern physics deals with the latter, for its "phase transitions." Might there not be "phase transitions" in my feelings? And, with Ilya Prigogine (1989) and his disequilibrium thermodynamics, showing how complex systems, forced from equilibrium, suddenly erupt into different, more *ordered* transitions, can we not expect as much for *my* feelings? That is, I do not look at neurophysiology or "brain science" for analogues, but at purely theoretical aspects of complexity. For Q, *concourse* conditions are veritable hotbeds of turbulence, chaos, and disequilibrium – not complicated telephone systems of nerves, cybernetics, or of information theory.

The achievement so far has been in relation to quantum theory. I have known since 1938, and before, that the quantum theory of Heisenberg, Niels Bohr, Planck, and Schrödinger was based on the same mathematical foundations as factor-analysis in psychometry (Burt, 1938). The subjective counterpart of this physics was patiently developed, with interruptions due to World War II (which preoccupied me from 1939-1947) and to other vicissitudes (such as wide disbelief in Q), into the present fledgling science, as proposed in a series of articles since the early 1970s (Stephenson, 1974, 1978, 1984, 1986a, 1986b, 1987, 1988a, 1988b, 1989a, 1989b) and many works now housed in the University of Missouri-Columbia Ellis Library Manuscripts Collection, side-by-side with the Western Historical Collection Society's good offices.

Q-technique now looms large in theoretical respects – it even echoes much of "phase transitions" in the new physics of today. It seemed a "crazy" idea, like much else in quantum mechanics. Anyone, however, who doubts the significance of Q-technique could read Harold I. Brown's "Galileo on the telescope and the eye" (1985), which provides a sober account of the difficulties facing innovation in instrumentation, even for the telescope. It was Galileo who took the crucial step toward development of modern observational science, and, to quote Brown "the key to this development is

the recognition that out unaided, uncorrected senses provide neither the only, nor even an adequate, source of scientific information" (Brown, 1985, p. 501).

Skinner's box for reinforcement of pigeons was such a source of scientific information. But it was only about the *object* in his sentence, "It occurred to me to go for a walk." Q-technique provides a way to provide scientific information about the *subject*, the *me*, of his sentence.

The transformation of a PE to quantized factor structure has been repeated hundreds of times during the past 50 years. Each is unique, but all are rendered scientific in the sense of universality by the introduction of laws (Stephenson, 1953). In the above case *James' Law* is operative, that A, B, are *mine*, C, *me*.

The achievement of Q was largely due to two chapters in William James *The Principles of Psychology* (1891), Chapter VIII, "The relation of minds to other things," and IX, "The stream of consciousness." In the former he formulated what is now the Principle of Complementarity, the same in psychology as in physics (Stephenson, 1986a). In the latter he distinguished between *transitory* and *substantive* thought. *Transitory* was where ideas were created, which, when put into speech or print or photography, became *substantive* (Stephenson, 1986b).

The former was referred to subjectivity, the latter to objectivity: but what became apparent is devastating. Substantive meant void of self-reference, and physics since Newton, and psychology since Wundt, especially with Skinner's form of Behaviorism, has faithfully kept to this rule. Transitive meant the initial creation of thought in the "stream of consciousness," some (and indeed much) of which was left behind when the person "perched" and made his/her thought substantive. Thus, the *substantive* portion is always likely to be incomplete, and is often "flawed and chimerical" (to quote James Joyce). Indeed Joyce's fame (for psychology) is that he distinguished sharply and brilliantly between these two modes of thought: *Ulysses* is eminently substantive for knowledge of the 19th century, except for Molly Bloom's famous monologue, which is preeminently self-referential and transitory. *Finnegans Wake* is a masterpiece of transitory thought, embracing, as Earwicher's dreams within dreams, history from ancient Greece to the early decades of the present century.

With what result? Most of the current literature housed in our libraries is scarcely like *Finnegans Wake*. Instead it is like *Ulysses*. And Joyce was at pains to show that it is "flawed and chimerical." At the turn of the century Einstein had come to the same conclusion about physics. Spearman, in *Psychology Down the Ages* (1937) had concluded that nothing genuinely substantive had come down the ages, from Egyptian and Greek times to now, except for the principle of pleasure-unpleasure (Spearman, 1937). And Husserl, to the same effect, had denied validity to both physics and phenomenology, in his *The Crisis of European Sciences and Transcendental*

Phenomenology (1938): he proposed a methodology pursued by many scholars since, including much of gestalt psychology, and much of present-day "humanitarian" psycho-therapy. James Joyce, critics now agree, has revolutionized the literary domain (Parrinder, 1984).

In short, four great men, at about the same decades in history, had come to the same conclusion, that *knowledge* (of the 19th century and before) was "flawed, if not chimerical." This applied to physics, now restored to sanity in quantum-theory; we propose the same restoration for subjective psychology; and literature and philosophy are beginning to find their own solutions in line with the predominance of transitive thought, in *all* sciences and humanitarian endeavors.

How, then, prove that these men were substantially correct?

This we do in terms of an article by Margaret A. Boden, "The structure of intentions" (1973), in which she called attention to the *complexity* of the most simple acts of behavior, and which led to my "Intentionality: How to buy a loaf of bread" (Stephenson, 1987).

Margaret A. Boden and a Loaf of Bread

Most of us at one time or another have bought a loaf of bread. Psychologists have paid little attention to the concept of *intention*, even though (as Skinner observed) philosophers are now interested. Heider (1958), following gestalt principles, represented intentions as forces in a person's life-space, as vectors pushing a person in a linear direction (Heider, 1958, pp. 82-112). This, Boden objected, hides the fact that intentions have inner structures, which are highly complex. The *complexity* as such appeared to be significant.

Boden's method was "conceptual analysis," and after 25 pages of closely argued analysis, she arrived at two principles to account for intentions, one a psychological component (*action-plan*) and the other a physiological component (*basic-action*). The present concern is with the former. For action-plan the end-state of an intention had to be made evident: what kind of loaf? Why? Fresh, old, wholemeal, white? To feed ducks? Or for cucumber sandwiches for Lady Bracknell at tea? There is problem-solving, guided by the subject's preferences and beliefs. Alternative procedures had to be considered – plans for going to the bakehouse, greeting the baker, handing over the money – all temporally ordered, at least in part (Boden, 1973, p. 25). Also re social relations: is the bread for Holy Communion? Or for resale? Also hidden purposes, underlying motives, needs, drives, etc. Of six men lined up to buy bread, all had quite different purposes. To embrace all such, in its enormous complexity, Boden suggested the necessity for the concept *action-plan*.

Similarly for the physical-physiological-neurological aspects of buying the loaf – lifting the bread from a basket, walking to the bakery, etc., are just as multifaceted as the psychological complexities; and again there was ready documentation for every aspect. The principle was called *basic-action*.

In 1970, when Boden was writing her article, she could conclude that every psychological and physiological principle then available to her in the works of William James, William McDougall, Wundt, Freud, etc., and in the literature on cybernetics and information theory, was *directly* involved in the behavior of buying a loaf of bread. There are motivational, procedural, physical-body aspects, and any satisfactory theory of *intention*, she concluded, must account for all of this (Boden, 1973, p. 44). She could scarcely fail to observe the utter complexity at issue.

Quantum Theoretical Connections

Ten years after Boden called attention to this complexity of making intentions, Ilya Prigogine, Nobel Prizewinner in Physics, published *From Being to Becoming: Time and Complexity in the Physical Sciences* (1980), in which he abstracted two principles of great importance – *irreversibility of time*, and *integration*. That time moves one inevitable way is now subject to proof. Physics is integrative, not disintegrative – the development of a chicken embryo is the *modus operandi* of life. What Prigogine had done, along with others, was to come to grips with complexity as such, and we now see this burgeoning into a new physics, as noted earlier, and now, for example, the subject of P. C. W. Davies' *The New Physics* (1989). Boden sensed the complexity; it was another matter, however, to ask for complexity as such to become the concern of a new physics. I have to suggest that Q-methodology, from 1950, was dealing with this same concept, as *concourse theory*.

Needless to say, it was possible to put Boden's thesis to experimental examination by using the abundant self-referential statements in her article of 1973. These statements represent something of her *transitory* thought, the fountain-head of creative thought, and her article was so rich in self-references that I kept it on my bookshelf for fifteen years, knowing that I would use it one day to see what it involves from a quantum-theoretical standpoint. A Q-methodological study along the lines outlined above for my walking out of a meeting provided the operant factors shown in Table 2.

Boden's 25 pages of conceptual analysis has been reduced to this simple table, for the *subjective* content (all the statements of the Q-sample were *her* subjectivity), and the result is *three* quantized factors, F1, F2, F3, not just one. Factor F1 is Boden's *action-plan*, and it is clearly in the direction of objectivity, i.e. of information theory. Factor F2 is a dynamic factor as a distinct aspect of the intentional behavior—she had denied such a link. Her analysis had been that a babe-in-arms has neither an Oedipus complex, nor knowledge of poisons, therefore it could scarcely generate an action-plan to spread a lethal does of arsenic on its father's toast! A satisfactory developmental theory had to explain, however, why an elder brother might perpetrate such an act. The Q-factor analysis gives the required dynamism for the latter, as well as for anything the babe-in-arms contributed.

Factor 3 is another quantized intentionality, and it corresponds to Prigogine's greater complexity, pointing to the indeterminateness rather than to Boden's classical determinism. It is recognition, on Boden's part, of the *extraordinary* complexity in social behavior.

Table 2: Factor Data for Boden's Transitory Thought

Q-sort Condition		Operant Factors: F1	F2	F3
1	Margaret Boden's position	X	--	--
2	Quantum theory position	--	--	--
3	Information-cybernetic position	X	--	--
4	Freudian position	--	X	--
5	"Image" position in 1960's	--	--	--
6	Bodily position (Boden)	X	--	--
7	Prigogine position	--	--	X

(X = significant loading, all other values insignificant)

Thus, there are three action-plans in Boden's essay, not one only. The factors, however, are not predictive. They are statements of *possibilities*. There is no "hidden variable" to explain all three; and the factors are not tested results of the reality functions of the Kantor formulation. They are *new* knowledge about "potentialities," "tendencies, not actualities," "promises," "nothing ever happening" (to use Heisenberg's words about the quantization phenomena in physics). Each factor has abstracted "a *feeing-state*," with this intrinsic intentionality, in Boden's transitory thought. Thus, it will not surprise us that F1 can lead to an article such as L. Miller's "Behaviorism and the significance of cognition" (1988); nor that F2 can lead to an article "Falsification and credulity for psychoanalytic doctrine" (Stephenson, 1956, and 1986); nor that F3 finds its possibilities in Griffin's (Ed.) *Physics and the Ultimate Significance of Time* (1986).

Skinner's Sentence

I now return to Skinner's sentence concerning an intention to go for a walk. This time I shall change it for another, "it occurred to me to buy a loaf of bread." It is now important to ask what is the fundamental *ground* upon which all such statements have a beginning for science.

My article "Intentionality: How to buy a loaf of bread" (Stephenson, 1987) obviously picks up where Margaret Boden's left off. With myself as subject I studied my own intention about buying a loaf. The *concourse* consisted of statements I uttered, such as the following:

I rarely make a shopping list, and if bread is needed, I often forget to buy it.

I doubt whether a loaf of bread ever put us into ecstasy or paradise.

The chemicals they put in bread to make it market-worthy worries me.

. . . and a hundred more.

For the past several years I have had the shopping thrust upon me because of my wife's infirmity – she suffered from Guillian-Barré Syndrome in late 1980. For a Q-sample of 40 statements, Q-factor analysis provided the following table of factors.

Table 3: Q-Factor Data for Shopping

1	My usual feelings	X	--	--
2	Historical feelings	--	--	X
3	Feelings particular to my wife's needs	--	X	--
4	Feeling particular to guest needs	--	--	--
5	Supermarket staff feeling	X	--	--
6	How I feel my wife feels about shopping	--	X	--
7	How my wife feels about me as a shopper	X	--	--

(X = significant loading, all other values insignificant)

Each Q-sort was performed by *me*. There are three intentionalities in complementarity. Factor A represents a certain *nonchalance* on my part—shopping is basically a chore. Since I retain British manners and accent, as the supermarket staff cannot fail to note, they are made (by *me*) to see *me* as I see myself (Q-sorts 1 and 5 are on Factor A).

Factor B is what I feel about shopping for my wife: she is a vegetarian, and bread is significant in her diet. Bread has more attention from me, when shopping, on this account – she finds most brands "standardized, nutritious, but is it enjoyable?"

Factor C is nostalgia: on our honeymoon, now nearly sixty years ago, in Ireland, we could choose from ten different breads. It was a *good feeling* about bread, apart from the *nonchalance* of A, and the *critical regard* of B.

The Outcome

The sentence, that I had intended to buy a loaf of bread, has been transformed to Table 3. In this case, however, every self-referent statement of the concourse, and each condition for a Q-sort, is in the everyday language of my culture. As Skinner observed "very complex social contingencies we call culture" are at issue – in short, in our example, the common everyday communicability complexity described in Margaret Boden's article, has entered this account of my intention re buying a loaf of bread, except for *feeling* and *self-reference* (which she largely missed).

It was the same for the distraught widow described elsewhere (Stephenson, 1986) whose house was aflame and who cried "Save my dog!"

Her factor-structure was completely for her utterances, as self-referent statement and as Q-sorts about the event.

The conclusion should be obvious, that every statement of self-reference discussed etymologically by Professor Skinner in his 1989 article, is subject to this same transformation to operant factors, all quantized, and all with intrinsic intentionality. In short, though we may save what is worth saving from traditional psychology up to now, the truth has to be faced, that it is all purely *categorical*, and not necessarily in *rerum natura*.

The Switch

Every reference in Boden's essay was common knowledge amongst academic psychologists of the 1960s, and none would doubt the complexity to which she called such detailed attention. Yet none, other than in Q-methodology, asked to investigation *in terms of her complexity as such.*

Already, as early as 1905, the advances being made by nuclear physics – at the discovery, for example, of radium by Henri Bacqueral in 1895 – had caught the imagination of many, including America's great historian Henry Brook Adams (1838-1918), who could write (in 1905) to a friend:

> The assumption of unity which was the mask of human thought in the middle ages has yielded very slowly to the proofs of complexity. The stupor of science before radium is a proof of it. Yet it is quite sure . . . that, at the accelerated rate of progression shown since 1600, it will not need another century to tip thought upside down. Law, in that case, would disappear as theory or *a priori* principle, and given place to force. Morality would become police. Explosives would reach cosmic violence, Disintegration would overcome integration.

The quotation is from Campbell's *The Masks of God: Creative Mythology* (1968, p. 620). Adams was aware of the stupor imposed on science in the past century, in comparison with the richness of the humanism of the Middle Ages, and therefore could make the switch (even though he was not a scientist) to modern, i.e. nuclear physics. And he was surely remarkable prophetic. International law, as *a priori* principle, has been replaced by Superpowers, and to military dictatorships all around the globe. Morality is not imprisonment – so many years incarceration for such-and-such an evil, with millions of men (not women) in the U.S.A, and U.S.S.R especially, subject to vast inhumanities. The bombing of Hiroshima and Nagasaki was of cosmic proportions. And if Marshall McLuhan's conclusion merits attention, all our institutions, of family, church, college, law, business, military, are in process of disintegration, with nothing replacing them integratively. Henry Adams was accurate as well as prophetic: the mark of stupor is still deeply planted in present-day psychology, which remains Cartesian and Newtonian, going nowhere.

If Henry Adams could understand so much in 1905, why is it that psychology remains in stupor?

Philosophy of science could have been of assistance. The only reference in Boden's essay is to von Neumann's contribution *The World of Mathematics* (ed, Newman, 1956), which postulated determinism to account for the enormous complexity of the human nervous system: automations are given well-defined functional characteristics which are "assumed to react to certain unambiguously defined stimuli, by certain unambiguously defined responses" (van Nuemann, in Newman, 1956, p. 2071). However, there are ample references to quantum theory in *The World of Mathematics*, in which von Neumann's article appears. Whitehead notes that it was for mathematics and physics to settle whether matrix algebra solves the problem of the "perplexing jumps" represented by quantum theory. Heisenberg, Born, and Jordan indeed did precisely that. The problem then became one for philosophers, and Whitehead tackled it:

> The discontinuous existence in space, this assigned to electrons, is very unlike the continuous existence of material entities which we habitually assume as obvious .... Those electrons, with the correlative protons, are now conceived as being the fundamental entities out of which the material bodies of ordinary experience are composed. Accordingly, if this explanation is allowed, we have to revise all our notions of the ultimate character of material existence. For when we penetrate to these final entities, this startling discontinuity of spatial existence discloses itself (Whitehead, in Newman, 1956, p. 415).

There are also brief but adequate excerpts from Werner Heisenberg's "The uncertainty principle" (Newman, 1956, p. 1051), the concern being with indeterminateness; and also with Bohr's *Concepts of Complementarity* (Newman, 1956, p. 1053).

All of this was around, in literature to which Boden, and Skinner, had access. Yet no hint of this appears in their work. The situation is the same today, in every issue of the many psychological journals issued by a profession, as Adams said, mired in the stupor of Newtoniam methodology.

Conclusion

At the outset the question was raised, as to whether Skinner's contingent reinforcement thesis is sustainable in view of the scientific methodology now available to us. The question turns on where we have to attribute the creative, initiating, function of the person. This, quantum mechanics would say, is a point where $t = 0$ in Schrödinger's equations, i.e. where past, present, and future are embraced in transitory thought (Stephenson, 1987). Skinner would have to place the origin in substantive thought, described as a person's outward behavior as perceived by the psychologists. Substantive thought, whatever it may be, is secondary to its formation in transitory thought.

Ergo: we must *begin* with the latter, and this means that Skinner's behaviorism has to be subjected to quantum-theory scrutiny, to see what it holds.

Complexity as such is at the roots of our concourse theory, long in formulation, but made evident in the early 1970s when I would be freed from

other commitments. *Consciring* should be the focus of the attention wasted on the *non-ens concsioucsness-of.*

There remains the prize of James' psychology, not merely its foundation in quantum theory, but the distinctiveness between transitory and substantive parts of consciring. This has astonishing implications. First, it supports the conclusions of four great scholars of the early decades of this century, Einstein, Spearman, Husserl, and James Joyce, that much of the 19th century *knowledge* is flawed. Second, we can not add that human behavior can be studied *de novo*, without any of the thousands of categorical constructs upon which psychology, in particular, currently functions, to grasp *profundities* that point to quantumized intentionalities, the basic creative elements of mankind. Third, it means that enormous masses of knowledge in libraries are currently gathering dust, as flawed, and indeed already forgotten about. Fourth, the distinction between transitory and substantive presents astonishing insights. We are in a process of vast *technological* advances on the heels of quantum theory, far outstepping the wildest dreams of many only a few decades ago. The technology, however, is dominantly becoming digitalized, and is intrinsically *informational*, not *communicability* such as we are considering in Q-methodology.

We return to Bixenstein of twenty-five years ago, who took Skinner to task. "Brain science", as Skinner called it, will prosper along its neurophysiological lines. The charge of complacency must stand, in face of the quantum-theoretical advance. How far self-reference is linked to behavior, not as its cause in a determinate sense (e.g. Irving Goffman, 1967), nor affect as contingent reinforcement, but as indeterminate intentionality, is already the way ahead, or so it seems, because it is intrinsically nature, in *rerum natura.*

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